

Holographic Wavefront Correction for SHADOE LIDAR Receivers, Phase I

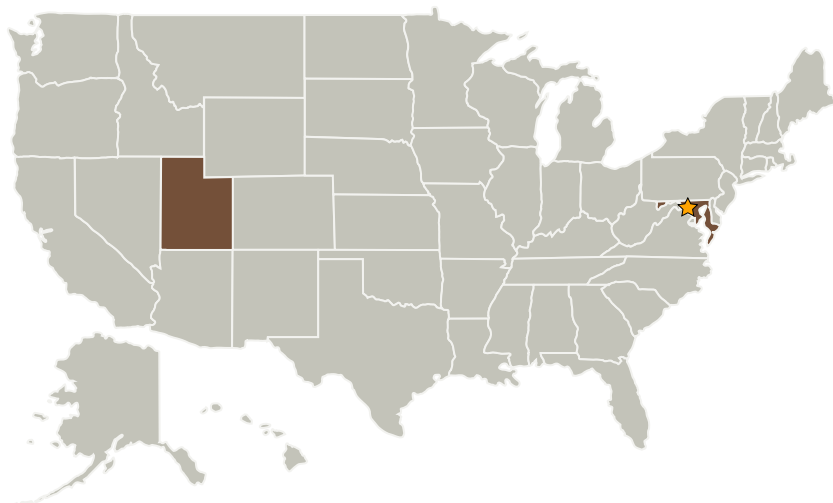
Completed Technology Project (2005 - 2005)



Project Introduction

Current shared aperture diffractive optical elements (SHADOE) have intrinsic residual wavefront errors on the order of 20 waves which limits the angular resolution of the LIDAR application to a range between 150 and 400 micro-radians. It is possible to reduce these aberrations by constructing a secondary holographic correction plate using the aberrated wave from the SHADOE as one of the two construction waves. The other construction wave is either a collimated wave or an $f\#2$ focused wave. All five overlapping apertures require individually constructed plates. This method of correction requires the use of the final playback wavelength for construction and so is useful for 532 and 355nm but not for 1064 nm. Computed diffractive optics can be used for 1064 nm using measured aberrations at the same wavelength. This proposal deals just with fabrication and test of the 355 nm LIDAR applications for which an entirely optical recording set up is adequate. Correction plates in the 2 inch diameter range are proposed with likely reduction in angular spread to under 50 micro-radians, which will greatly improve the signal to noise numbers in a LIDAR application.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center
(GSFC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Wasatch Photonics, Inc.	Supporting Organization	Industry	Logan, Utah

Primary U.S. Work Locations

Maryland	Utah
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Richard D Rallison

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers